

INTELLIGENCE AND PARANORMAL BELIEF: EXAMINING THE ROLE OF CONTEXT

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ABSTRACT: This paper examines the role of context in the relationship between belief in the paranormal and intellectual ability. It is argued that expressed paranormal belief is dependent upon the context in which it is measured and that such context effects may account for disparities in research findings of earlier investigators. Sixty participants were divided equally into three conditions. All participants completed the Raven Advanced Progressive Matrices, Set 1, a short test used as an indicator of intellectual ability. Participants in one condition were presented with a pro-paranormal context statement that cast paranormal belief in a positive light. Participants in the second condition were presented with an anti-paranormal statement that cast paranormal belief in a negative light. Participants in the third condition acted as a control group and were therefore given no context statement. All participants then completed Tobacyk and Milford's (1983) Paranormal Belief Scale. It was predicted that paranormal belief scores would be highest in the pro-paranormal condition, and lowest in the anti-paranormal condition. This prediction was confirmed. It was further hypothesized that this context effect would be more apparent among participants of high intellectual ability, resulting in a spurious positive correlation between belief scores and intelligence scores in the pro-paranormal condition, and a spurious negative correlation in the anti-paranormal condition. No correlation was expected in the control condition. This hypothesis was not confirmed. Significant negative correlations were obtained in both the pro- and anti-paranormal conditions. A nonsignificant negative correlation was obtained in the control condition. These results do not support the notion that reports of negative correlations between paranormal belief and intellectual ability are accounted for by context effects on paranormal belief scores. Implications and limitations of these findings are discussed.

Many researchers have examined psychological differences between people who believe in the paranormal and people who do not believe in the paranormal (see, e.g., French, 1992; Irwin, 1993). For example, such beliefs have been found to be positively correlated with creativity and sensation seeking (Davis, Peterson, & Farley, 1974), hypnotic susceptibility (Wagner & Ratzeburg, 1987), neuroticism (Windholtz & Diamant, 1974), fantasy proneness (Irwin, 1991a), and ostensible psi ability (Lawrence, 1993).

One focus of this research has been to assess whether those who believe in the existence of paranormal phenomena are cognitively inferior to

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Table 1
 FULL SCALE AND MEAN SUBSCALE SCORES IN PRO-PARANORMAL,
 ANTI-PARANORMAL, AND NEUTRAL CONTEXT CONDITIONS

	Pro- paranormal (<i>n</i> = 20)	Anti- paranormal (<i>n</i> = 20)	Control (<i>n</i> = 20)	<i>H</i> (corrected for ties)	<i>p</i> (one- tailed)
Full scale	71.00 (15.50)	54.70 (17.64)	66.45 (20.51)	7.40	.01
<i>Subscales</i>					
Spiritualism	2.89 (1.11)	2.30 (1.31)	2.76 (1.10)	2.67	.13
Psi	2.91 (.92)	2.28 (.83)	2.91 (1.21)	5.33	.03
Precognition	3.52 (.92)	2.80 (1.12)	3.27 (1.00)	4.55	.05
Witchcraft	2.98 (1.16)	2.04 (1.05)	2.60 (1.00)	7.20	.01
Superstition	1.90 (.94)	1.30 (.51)	1.75 (1.09)	6.00	.02
Extraordinary Life Forms	2.47 (.96)	2.1 (.75)	2.15 (1.12)	2.16	.17
Traditional Religious Belief	3.14 (1.10)	2.43 (1.33)	2.94 (1.30)	3.58	.08

Note. *H* values with a corresponding *p* < .05 indicate a significant effect of context on scores (SDs in brackets).

those who disbelieve such phenomena. For example, Alcock and Otis (1980) asked participants to complete Watson and Glaser's (1964) Critical Thinking Appraisal Scale and found that paranormal believers demonstrated a significantly lower level of critical thinking than disbelievers. In addition, Wierzbicki (1985) found that believers made more errors on a test of syllogistic reasoning than did disbelievers. However, other studies

cast doubt on these findings. For example, Irwin (1991b) found no correlation between paranormal belief scores and reasoning skills, Thalbourne & Nofi (1997) found no evidence of a correlation between belief and performance on an IQ test, while Jones, Russell, and Nickel (1977) reported a positive relationship between paranormal belief and intelligence.

One possible reason for the disparity in these empirical findings concerns the context in which the studies were conducted. Some evidence suggests that the degree to which individuals express belief in the paranormal may be to some extent dependent on the social and intellectual context in which it is measured. For example, Fishbein and Raven (1967) found that belief in ESP could be influenced by prior exposure to positive or negative information about ESP. They found that participants' expressed beliefs were increased after reading an article that promoted such phenomena, while participants presented with an article that stressed the methodological weaknesses of ESP experiments showed lower belief scores. In addition, Layton and Turnbull (1975) and Crandall (1985) found that participants tested by an experimenter who displayed a personal belief in ESP and a positive evaluation of ESP research expressed higher belief than did participants tested by an experimenter who showed a negative opinion of ESP. These studies suggest that individuals' paranormal belief is participant to demand characteristics of the test situation. Irwin (1985, 1991b, 1993) has proposed that such interventions do not necessarily change participants' views; rather, they affect participants' willingness to express that belief. If so, this may have considerable implications regarding the validity of purported correlates of paranormal belief.

Irwin (1991b) has speculated that context effects may explain why he did not find a difference in reasoning skills between believers and disbelievers as reported by earlier researchers. He argued that all of the earlier studies had been conducted by publicly professed skeptics whose implicit objective was to show that paranormal believers were credulous, uncritical, and foolish people. Given this as the case, Irwin (1991b) suggests that this is likely to be an important factor in the outcome of such research:

Specifically, it is suggested that critically minded participants in previous studies were aware of the investigators' skeptical attitude toward the paranormal and may well have taken this as a cue to be reticent about their own paranormal beliefs. Participants who perform highly on a test of critical thinking may thus present with relatively low paranormal belief merely because they are more alert to the experimenter's own skepticism. (p. 289)

The result of such a context effect would be a spurious negative correlation between reasoning ability and paranormal belief due to believers with high reasoning ability presenting lower belief scores. Irwin, on the

Table 2
SPEARMAN'S RHO CORRELATION COEFFICIENTS BETWEEN PARANORMAL
BELIEF AND RAVEN MATRICES SCORES

Spearman's <i>rho</i> (corrected for ties)				
	Pro- paranormal (<i>n</i> = 20)	Anti- paranormal (<i>n</i> = 20)	Control (<i>n</i> = 20)	Overall (<i>N</i> = 60)
Full scale	-.53**	-.49*	-.26	-.29**
<i>Subscales</i>				
Spiritualism	-.61**	-.44*	-.16	-.35**
Psi	-.37	-.37	-.41*	-.30**
Precognition	-.48*	-.34	-.24	-.25*
Witchcraft	-.35	-.16	-.23	-.16
Superstition	-.44*	-.21	-.12	-.18
Extraordinary life forms	-.13	-.21	.09	-.05
Traditional religious belief	-.07	-.29	-.20	-.14

p* < .05, *p* < .01

other hand, describes himself as being perceived as open-minded in his approach to parapsychology. He suggests that participants in his study did not feel that they needed to hide their belief in the paranormal and so gave more honest answers on the belief questionnaire, perhaps giving a truer picture of the relationship between reasoning ability and paranormal belief. It follows that, according to this model, a spurious positive relationship between paranormal belief and reasoning ability might be expected in a context which actively encourages a belief in the paranormal (assuming it is only those participants who score high on the reasoning task who inflate their belief scores accordingly).

It is also possible that participants' scores on tests of cognitive ability are influenced by the context in which the tests are taken. For example,

participants who are not motivated to complete such a test are unlikely to perform as well as they might, thus resulting in scores that underestimate their true ability. Participants with high paranormal belief may not be at all motivated to complete tests administered by an investigator who is openly opposed to parapsychology. In such a situation, we would again find that high paranormal belief corresponded with spuriously low cognitive ability performance.

In short, studies that examine the relationship between cognitive ability and paranormal belief may be heavily dependent on context. The social and intellectual context in which a study is conducted may influence participants' paranormal belief scores by affecting their willingness to admit to such beliefs or it may influence participants' scores on tests of intellectual ability by affecting their motivation to complete such tests.

The present study formed an initial attempt to empirically test the notion that context effects on expressed paranormal belief could account for reports of a negative relationship between belief and cognitive ability. Participants were administered a short measure of intelligence before being presented with either (a) a pro-paranormal context statement, (b) an anti-paranormal context statement, or (c) no context statement before completing a questionnaire concerning paranormal belief. The pro-paranormal context statement depicted paranormal beliefs as being acceptable and desirable, while the anti-paranormal statement depicted paranormal beliefs as undesirable. Thus, it was the intellectual context that was being manipulated rather than the social context. It was predicted that participants who were presented with the pro-paranormal statement prior to completing the paranormal belief questionnaire would present higher global paranormal belief scores than participants in the control condition. Similarly, it was predicted that participants presented with the anti-paranormal statement would present lower belief scores than those in the control group. It therefore followed that participants in the pro-paranormal condition would exhibit higher belief scores than participants in the anti-paranormal condition.

It was further hypothesized that these manipulations of expressed paranormal belief would result in varying correlations between intelligence scores and belief scores in each of the three conditions. This prediction extrapolates Irwin's (1991b) suggestions in two ways. First, Irwin's speculations refer specifically to critical reasoning rather than general intellectual ability. Second, Irwin's comments focus on how a skeptical context may influence the belief score of critically minded participants. The present study extends this to examine the possible related effects of a pro-paranormal context upon the relationship between belief scores and intelligence scores. If participants of high intellectual ability are more likely to modify their expressed belief in a skeptical context, then they may also be

more likely to do so in a pro-paranormal context. In this case, high-intelligence participants would be more aware that paranormal beliefs were being encouraged and so increase their responses accordingly. A pro-paranormal context may therefore give rise to a spurious positive relationship between belief scores and intelligence scores. Thus, in short, it was predicted that there would be a negative correlation in the anti-paranormal condition, a positive correlation between belief and intelligence scores in the pro-paranormal condition, and no correlation in the control condition.

METHOD

Design

The independent variable was the context condition into which participants were placed. There were three conditions: pro-paranormal context statement, anti-paranormal context statement, and no context statement (control condition). Participants were randomly assigned to one of these conditions. The two dependent variables were paranormal belief scores and intelligence scores. The intelligence test was administered prior to the participants' exposure to the context statements to ensure that all intelligence scores were obtained under similar conditions.

Participants

Sixty psychology undergraduates from the University of Central London and University of Hertfordshire (34 female, 26 male) participated in the study. Ages ranged from 18 years to 37 years (mean age 21.1 years). Participants were paid £2 for participating.

Materials

Paranormal Belief Scale. Belief in the paranormal was measured by using Tobacyk and Milford's (1983) Paranormal Belief Scale. This 25-item questionnaire consists of statements to which participants are required to mark their agreement or disagreement. It has seven subscales, each consisting of either three or four items. These subscales are: Traditional Religious Belief (e.g., *I believe in God*), Psi Belief (e.g., *A person's thoughts can influence the movement of a physical object*), Witchcraft (e.g., *Black magic really exists*), Spiritualism (e.g., *Reincarnation does occur*), Superstition (e.g., *The number 13 is unlucky*), Extraordinary Life Forms (e.g., *Big Foot exists*), and Precognition (e.g., *Dreams can provide information about the future*). Responses are made on a five-point Likert scale (where 1 = *strongly disagree* and 5 = *strongly agree*).

Global paranormal belief scores are calculated by summing responses. Individual subscale scores are the means of ratings on the relevant subscale of items.

Intelligence test. The Advanced Progressive Matrices Test, Set 1 (Raven, 1976) was used as an indicator of intelligence. This test consists of twelve problems in which the participant is required to select the correct solution from eight possible solutions in order to complete a geometric pattern. Participants are allowed five minutes to complete all twelve problems, and scores are simply the number of correct responses. This test was chosen because it has been shown to be a reliable indicator of intellectual ability that takes only a few minutes to administer.

Context statements. Two context statements were used: one pro-paranormal and one anti-paranormal. The pro-paranormal statement drew attention to a recent survey that showed belief in the paranormal to be common; it also cited recent experimental evidence that supports the existence of psi, and research that links belief in the paranormal with creativity and artistic ability. The anti-paranormal statement stressed how the subject area has suffered from fraudulent claimants, that evidence for paranormal phenomena is weak, and that clinical research has linked belief in the paranormal with psychosis and schizophrenia. (Both context statements can be found in the Appendix.)

PROCEDURE

Participants were told that they would be required to complete a short test followed by a 25-item questionnaire. They were then given five minutes to complete the Advanced Progressive Matrices Test, Set 1. Following this, they were presented with written standardized instructions for the second part of the experiment. These instructions explained that this second part was concerned with beliefs in paranormal phenomena and contained the appropriate context statements. Participants were randomly assigned to one of the three conditions (pro-paranormal, anti-paranormal, and control). There were 20 participants in each condition with 8, 11, and 7 males in the pro-, anti-, and control conditions, respectively. All participants then completed Tobacyk and Milford's (1983) Paranormal Belief Scale. Participants were fully debriefed and were informed that full feedback of the results could be provided upon request.

RESULTS

Mean global paranormal belief scores and mean subscale scores in

each of the three conditions are shown in Table 1.¹

It can be seen that paranormal belief scores were, on average, highest in the pro-paranormal condition, followed by the control condition, with participants in the anti-paranormal condition presenting the lowest scores. A Kruskal-Wallis one-way analysis of variance showed that scores differed significantly across context conditions for the full scale (H , corrected for ties = 7.40, $p = .01$, one-tailed). Post hoc analyses of the subscale data showed that the context had most effect on the Witchcraft ($p = .01$, one-tailed), Superstition ($p = .02$, one-tailed), Psi ($p = .03$, one-tailed), and Precognition ($p = .05$, one-tailed) subscales. Multiple comparison tests showed that differences were significant only between the pro-paranormal condition and anti-paranormal condition.

Spearman's ρ correlations were calculated between paranormal belief and scores on the Raven Matrices test for each of the three conditions. These are shown in Table 2. Significant negative correlations were found in the pro-paranormal condition for the full scale and for the Spiritualism, Precognition, and Superstition subscales. In addition, correlations for the Psi and Witchcraft subscales were also negative and approached significance (in each case $p = .06$), while scores on the remaining subscales showed nonsignificant negative correlations. Significant negative correlations were also found in the anti-paranormal condition for the full scale and for the Spiritualism subscale, with negative correlations for the Psi and Precognition subscales approaching significance ($p = .06$ and $.07$ respectively). In the control condition, a nonsignificant negative correlation was found for the full scale. In this condition, a significant negative correlation was found only for the Psi subscale.

A Fisher's r test was used to assess whether correlations differed between conditions. It was found that correlations did not differ significantly between conditions for scores on the full scale or on any of the subscales.

DISCUSSION

This study found that global paranormal belief scores and scores on four of the subscales differed significantly across the three context conditions. However, context was not found to significantly affect correlations between intelligence scores and belief scores. Indeed, all but one of the reported correlations (that for the Extraordinary Life Forms subscale in the control condition) were in the negative direction. It is noticeable that correlations in the pro-paranormal condition tended to be higher in

¹ It should be noted that scores on the full scale and scores on subscales are not independent of each other.

magnitude (although not significantly so) than in the anti-paranormal condition, contrary to what was predicted.

These findings clearly do not support the notion that individuals who score high on tests of intellectual ability are more likely to show depressed paranormal belief scores because of a skeptical context. That is, negative relationships between beliefs in the paranormal and cognitive ability do not appear to be due to manipulations of belief scores by context. Although these results corroborate earlier findings suggesting a negative relationship between belief and cognitive ability (e.g., Alcock & Otis, 1980; Wierzbicki, 1985), extending these findings to include abstract reasoning results in data that are still at odds with findings that suggest no such relationship (e.g., Irwin, 1991b; Thalbourne & Nofi, 1997). Furthermore, they do little to explain the positive relationship between belief and intelligence reported by Jones, et al. (1977).

However, the present findings should be interpreted with caution. First, the measure of paranormal belief employed may not be ideal. The Tobacyk and Milford (1983) scale, along with its unpublished revised version (Tobacyk, 1988), is one of the most popularly used measures of paranormal belief and is useful in that it acknowledges the multidimensional nature of paranormal belief. However, Lawrence (1995) has argued that the scale is based upon less than strong methodology and that the seven factors identified by the subscales oversimplify the structure of paranormal belief (see Tobacyk, 1995, for a response to this critique). Second, the Raven Matrices test used was a short form of the full Raven Matrices intelligence test, and is used only as an indicator of how an individual would perform on the full test. Furthermore, the Raven test might best be described as a measure of nonverbal, abstract reasoning, and one might question how closely performance on such a test relates to other aspects of cognitive ability such as critical reasoning and syllogistic reasoning. Indeed, Irwin's (1991b) speculation about the possible role of context was made with specific reference to critical reasoning rather than the more abstract type of reasoning measured in the present study. Context effects may well be more apparent with regard to the relationship between paranormal belief and critical reasoning. Third, the context statements used were very brief and fairly ambiguous in nature. Thus, although they appeared to be strong enough to manipulate expressed belief to a significant degree, they may have been too superficial to allow possible differential effects between high- and low-intelligence participants to be assessed. In addition, as noted by one reviewer of this paper, the long-term university context surrounding our participants should not be ignored. All participants were psychology undergraduates who had come into contact with psychology lecturers (assuming, of course, that they had been attending their lectures). Psychology lecturers' general skepticism toward the paranormal

may well have been apparent to our participants and may have influenced their expressed belief in a more powerful way than the context manipulations that were used.

The role of gender differences in expressed paranormal belief must also be acknowledged. Many researchers have found the endorsement of paranormal beliefs to be stronger among females than males for both global belief and for most of the specific dimensions of paranormal belief (Irwin, 1993). This was also found to be the case in the present study. Females showed significantly higher scores for both the full scale and all but one of the subscales, Extraordinary Life Forms. This would not present a problem had there been the same number of males in each condition. Because participants were assigned randomly to conditions, the pro-paranormal condition included 8 males, the anti-paranormal condition included 11 males, and the neutral context condition included 7 males. It could be argued that the slight preponderance of males in the anti-paranormal condition could account for the differences in belief scores between conditions and not the differing contexts, hence explaining the lack of a context effect on the belief-intelligence relationship. This would be a problem if males' belief scores were no different across the three conditions, because it would question the role of context in manipulating belief scores. However, a post hoc analysis showed that males' belief scores differed significantly across conditions in the direction suggested by the contexts (H , corrected for ties = 5.71, $p = .03$, one-tailed) allaying concerns that gender differences account for differences between conditions.

The findings suggest that, although paranormal belief scores can be manipulated by the intellectual context in which they are obtained, such manipulation does not appear to account for the negative correlations between belief and cognitive ability reported by skeptical investigators. Instead, the results suggested that negative correlations would be obtained whether the context was pro-paranormal or anti-paranormal. For a fuller picture, however, the possible role of context effects upon scores on tests of intellectual ability needs to be empirically examined. As noted at the start of this paper, participants with high levels of paranormal belief may not be at all motivated to complete a test of cognitive ability administered by an investigator who is openly opposed to the paranormal. The result would be that high paranormal belief scores correspond with low cognitive performance. It may be that this kind of context effect will influence the relationship between belief scores and cognitive performance.

To test this possibility, the context in which the intelligence test is administered (rather than the Paranormal Belief Scale) could be manipulated. It is likely that such a context manipulation would need to be much richer than the brief context statements used in the present study. A simple statement for or against the paranormal is unlikely to significantly affect an

individual's motivation to complete a test of his or her intellectual ability. A more effective method of manipulating intelligence scores through context would be to administer the test immediately after a giving a lecture that was either very positive or very skeptical about parapsychology and the paranormal. Individuals who sat through a lecture that was at odds with their own views would have little motivation to complete an intelligence test, especially if they thought that it formed part of that lecturer's research. Thus, in a skeptical context believers would be expected to show depressed cognitive performance, and in a pro-paranormal context, disbelievers would be expected to show depressed performance.

In short, the findings of the present study highlight the dependency of expressed paranormal belief upon the context in which it is measured, thus confirming the findings of other researchers. This finding has clear implications for any study of purported correlates of belief in the paranormal. However, it would appear that the relationship between paranormal belief and intelligence (as measured by the Raven Matrices test) is not context dependent, but, instead, that belief is negatively correlated with intelligence whether the intellectual context is pro- or anti-paranormal.

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APPENDIX

Pro-paranormal context statement:

A recent survey carried out in North America revealed that as many as one in four people believe in ghosts, one in three believe in the devil, and as many as one in ten believe that they have seen or communicated with the dead.

*Perhaps more importantly, Daryl Bem and Charles Honorton recently published an article in *Psychological Bulletin* showing strong empirical evidence in favor of the existence of psi (in the form of extrasensory perception). Since then, this study has been replicated and the initial results support those of Bem and Honorton.*

In addition, some research has linked strong beliefs in paranormal phenomena with high scores of creativity and artistic ability. However, this is under much debate.

Anti-paranormal context statement:

Much evidence in favor of paranormal phenomena has been repeatedly falsified or shown to be mere coincidence. Many argue that the entire subject area is rife with charlatans seeking to make money out of the easily gullible.

Psychological investigation has yet to verify the existence of any paranormal phenomena despite repeated research in this area.

In addition, some clinical research has linked strong beliefs in paranormal phenomena with psychosis and schizophrenia. However, this is under much debate.